

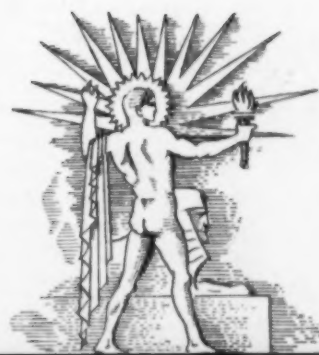
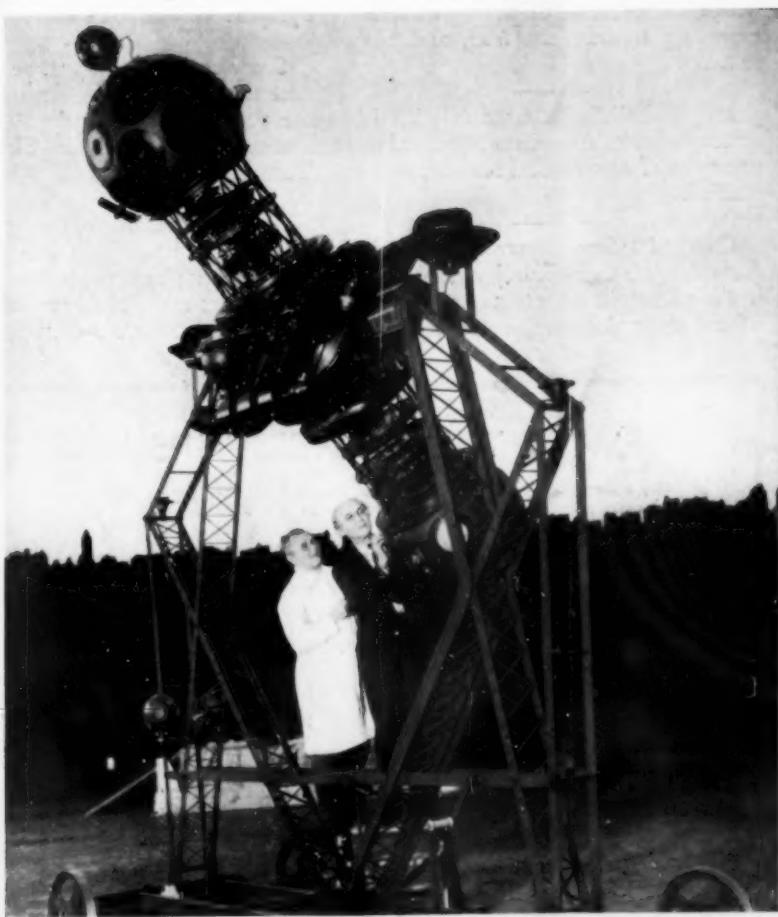
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# SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE •



SEPTEMBER 21, 1935

Bringing Stars Indoors  
See Page 184

A

SCIENCE SERVICE PUBLICATION

## SCIENCE NEWS LETTER

VOL. XXVIII



No. 754

The Weekly Summary of

## Current Science

Published Every Saturday by

## SCIENCE SERVICE

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## DO YOU KNOW?

Indians valued a well-made bow as equal in trade to a horse and blanket.

A finger nail grows one twenty-fifth of an inch in ten days and a toe nail only half as fast, according to experiment.

The University of California has a number of students of Chinese extraction who are studying the Chinese language.

Although the gladiolus was known to the Greeks and Romans, the types now cultivated are less than a hundred years old.

Milan, Italy, has made experiments with an assortment of paving materials, including rubber, cast iron, and sandstone.

Italy is building a large aviation laboratory where stratosphere flight and other angles of aeronautical research will be studied.

Over 900 fawns have been shipped from Kaibab National Forest, Arizona, in the past eight years to parks, zoos, and other public places in 34 states.

Normal blood temperature of most reptiles stays about one degree above the surrounding air.

Cattle breeding and grain growing in the highlands of the Pamirs are being studied by a Soviet expedition.

The Navajo Indian reservation is larger than the State of West Virginia, and has a population of nearly 50,000 fullblood Indians.

Weighing the population of a termite mound nest in Australia, a scientist calculated that the colony held 1,561,400 workers, 201,000 soldiers, and 44,100 nymphs.

Sooty and noddy terns, not known to nest anywhere else in the United States are protected in the new Fort Jefferson National Monument in Florida's Dry Tortugas Keys.

In early Christian centuries, Egyptians divided the hours into halves, quarters, and eighths; and modern division into 60 minutes made of 60 seconds is no older than about 1000 A.D.

## WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

## ASTRONOMY

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## PLANT PATHOLOGY

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In what way does an epidemic of tree disease affect British sport? p. 179.

## PSYCHOLOGY

Can alcohol cause loss of intelligence as well as a psychosis? p. 184.

How can absent-mindedness be prevented? p. 186.

## PUBLIC HEALTH

Has the spreading pneumonic plague infected men? p. 190.

How has the depression affected the health of the children of the chronically poor? p. 185.

## SEISMOLOGY

How have scientists learned of the structure of the semi-plastic material beneath the earth's crust? p. 188.

How many earthquakes occur during a single year? p. 184.

## CHEMISTRY

# Heavy Neon is Concentrated To Purity of 99 Per Cent.

**Achievement Hailed as of Great Importance and Comparable With Discovery of Heavy Hydrogen**

**P**REPARATION of 99 per cent. pure "heavy" neon, the gaseous element most widely known for its use in reddish advertising signs, was announced before the meeting of the British Association for the Advancement of Science in Norwich, by Dr. Gustav Hertz of the Siemens-Halske Company, Berlin.

The achievement is comparable with the concentration of pure heavy hydrogen for which Prof. Harold C. Urey, Columbia University, recently was awarded the Nobel Prize in Chemistry, because of the importance of neon in experiments on atomic structure.

Ordinary neon gas consists of two isotopes, which are chemically indistinguishable but have different atomic weights. The lighter and predominating fraction has an atomic weight of 20 and the heavier one a weight of 22. As found naturally, they occur in the proportion of nine to one, respectively, and give the average atomic weight of 20.2.

Dr. Hertz's concentration of the mass 22 kind of neon makes the second case where an isotope has been separated in usable quantities. Hydrogen's heavy isotope is the other.

Samples of the almost pure heavy neon have already been given to Prof. F. W. Aston, Cambridge University, England's most famous experimental scientist dealing with atomic weights. Another sample is being rushed to Dr. Kenneth Bainbridge of Bartol Research Foundation, Swarthmore, Pa., for analysis on his mass-spectrograph. Prof. Ernest O. Lawrence, University of California, may also receive some of the precious heavy neon for experiments in nuclear physics.

Commenting on the concentrated heavy isotope of neon, Prof. Aston hailed the work as a great aid to experiments on nuclear disintegration, because by using the heavy neon gas, investigators can be sure that its weight is unambiguously 22. Recent work has shown that nuclear studies such as artificial radioactivity and transmutation ought to be done, for best results, with really pure elements; the word pure being used in its physical as well as chemical meaning.

Dr. Hertz uses the diffusion technique

for separating the neon isotopes. A battery of tubes containing porous material is filled with pure neon gas as obtained chemically. Mercury vapor pumps drive the neon through the system. As the gas comes to the porous material, the lighter kind of neon passes through a little faster than the heavier kind because of the difference in the diffusion rates.

The lighter fraction passes back to the opposite side of the porous tube and repeats the process while the heavier fraction passes on to the second porous tube, then to a third, and so on. Each porous tube has the return system whereby the lighter isotope is each time returned to repeat the diffusing process. Continuous operation and circulation of the gases is maintained by the pumping system.

Starting with the original neon gas in the ratio of 9.3 parts of isotope of mass 20 to one part of isotope of mass 22, only one hour is needed to bring them to equal concentrations. Five hours suffice to bring the heavier isotope up to 98 to 99 per cent. concentration.

*Science News Letter, September 21, 1935*

## BOTANY

## X-Rayed Bulb Produces Lily That Never Sheds Pollen

**A**N "X-RAY lily" that keeps its petals shining white by never shedding its pollen on them has been originated in the research laboratories of the General Electric Company, by C. N. Moore. The new variety has been given the provisional name of "Roentgen Regal Lily," in honor of the discoverer of X-rays, and patent to protect it has been applied for.

Many species of lily have the habit of shedding pollen from their big yellow anthers as these ripen and burst. The yellow dust, scattered on the shining petals, disfigures the flowers in the opinion of many purchasers. Florists also claim that if this fertilizing dust falls on the receiving surface of the pistil, the flower dies sooner.

For this reason, florists generally tear off the anthers as soon as the lily opens.



**ROENTGEN REGAL LILY**

*This beautiful flower has the peculiar virtue of never shedding its golden pollen.*

This, however, is a tedious hand job, adding to the cost of the flowers. Moreover, to many flower lovers these de-antherized lilies appear simply mutilated. A lily that can keep its golden anthers and yet not shed pollen on the petals is therefore a very desirable thing.

Mr. Moore started four years ago toward the goal he has finally attained. He treated three lots of regal lily bulbs to varying doses of X-rays. Most of them did not show any effect, though a few did produce deformed or otherwise freakish flowers.

Two bulbs, however, gave rise to new generations of bulbs which produced flowers with non-shedding anthers, and these were the vegetative ancestors of the stock he now has blossoming. The natural-appearing pollen-sacs swell up in the usual fashion, but never burst. Instead, they finally begin to dwindle slowly, and the pollen is never liberated.

*Science News Letter, September 21, 1935*

## PLANT PATHOLOGY

## Willow Disease Threatens Cricket, Sport of English

**S**UPPOSE Lou Gehrig's bat should break every time he hit a ball.

Suppose every baseball player's bat should break, every time anybody hit a ball.

That nightmare situation is what menaces cricket, which means even more to English boys than baseball does to young Americans—if that can be imagined. The cricket-bat willow, main reliance of the game, is afflicted with a widespread epidemic known as watermark disease, which



makes its wood unfit for shaping into the flat-sided bats used in the great British sport.

The disease is due to a swarming bacterium, which was described before the meeting of the British Association for the Advancement of Science by Dr. W. J. Dowson, specialist in fungi at Cambridge University. The cause of the disease had been identified by an earlier worker, and Dr. Dowson confirmed his results, against which doubts had been raised later.

Watermark disease afflicts 25,000 cricket-bat willows in one English willow-raising region alone, Dr. Dowson

said. The dead trees, left standing, spread the epidemic among those still living.

When watermark disease attacks a willow, the leaves wither and turn brown prematurely, and then drop off. Volunteer shoots sprout from the living tissue below the dead wood. After two or three years, the tree dies completely, and a bacterial ooze comes out of chance small wounds.

The wood has a water-soaked appearance, and is darkly marked in streaks and patches. Masses of bacteria are crowded in its water-conducting vessels. It is utterly unfit for use.

*Science News Letter, September 21, 1935*

#### ASTRONOMY

## New Asteroid Takes 7 Years For Journey Around the Sun

**D**EFINITELY an asteroid, but a most peculiar one, is astronomy's verdict on the strange celestial object imaged on a photographic plate at the Mount Wilson Observatory, California. The photographic record of its appearance was discovered by Dr. Edwin P. Hubble, and measured by Dr. Seth B. Nicholson.

The newly discovered asteroid is remarkable for two things: the large eccentricity and the high angle of its orbit, which has just been calculated independently by two astronomers, Prof. Harlow Shapley, director of the Harvard College Observatory, informed Science Service. One of the computations was made by L. E. Cunningham, of Harvard, and the other by Dr. Paul Herget of the University of California. Both were reported to the clearing-house for astronomical information maintained at the Harvard College Observatory.

These two preliminary orbit-calculations show the new asteroid to have a period of revolution around the sun of seven years. The orbit is a long ellipse, with the sun well to one side of center. It is, moreover, inclined at an angle of forty degrees to the ecliptic, or path of the planets. Its position, far outside the zodiacal belt in which the great majority of asteroids move, first attracted attention to it as something really unusual.

At present the asteroid, which is too small to be seen without a telescope, is in the constellation Cassiopeia. Cassiopeia is a W-shaped group of stars in the northern sky, on the opposite side of the Pole Star from the Great Dipper.

Additional observations have been made at Harvard College Observatory, which will permit the more accurate determination of the orbit.

*Science News Letter, September 21, 1935*

#### MEDICINE

## Claims Electricity Better Than Malaria for Fever Treatment

**E**LECTRICAL methods of inducing fever are better than malaria for the treatment of the mental disease resulting from syphilitic infection, Dr. Ralph H. Kuhns of the University of Illinois College of Medicine told members of the American Congress of Physical Therapy.

Dr. Kuhns based his opinion on experience with both forms of treatment of

dementia paralytica in the state hospitals of Illinois.

Most important for the success of fever treatment, regardless of the method used to induce the fever, is starting the treatment early before serious mental deterioration has set in, Dr. Kuhns emphasized.

"In producing remissions and possible cures in many patients who were former-

ly given up as hopeless, we have effected a tremendous saving for the taxpayers of the state of Illinois, in addition to ameliorating the ravages of this dread disease," he said.

One of his objections to infecting the patients with malaria in order to produce the curative fever is the high death rate among patients treated with malaria. In the Elgin State Hospital this was 12 per cent., higher than for any other form of treatment. In addition to the danger to the patient, there is the possible danger of introducing malaria into the rest of the hospital population or possibly into the community outside the hospital. Dr. Kuhns quoted a recent statement of Dr. H. J. Shaughnessy, of the Illinois state health department, calling attention to this danger.

Of the various electrical methods of inducing high curative fever in the patients, Dr. Kuhns reported that he and his associates found the electric blanket safest and simplest. The blanket is about six feet square and is plugged by a connecting cord into an electric socket in the wall. The patient is first wrapped in blankets and then covered by the electrically heated blanket.

Three hundred patients have been treated by this method during the last five years at the Elgin State Hospital and the State Psychopathic Institute. Nearly three-fourths of these were definitely improved, one-tenth remained stationary, 7 per cent. deteriorated and 11 per cent. died. Nearly one-third of the improved patients were discharged by the Elgin State Hospital and 14 per cent. are now on parole.

*Science News Letter, September 21, 1935*

#### GENERAL SCIENCE

## Plea for Linguistic Mercy Made to Soviet Scientists

**R**USSIAN language, in its baffling Cyrillic alphabet, is too much of a hurdle for Western scientists who need to know what is in Russian scientific publications; wherefore Russian researchers are asked if they will not kindly announce their discoveries in English, German or French, by Prof. Horace Elmer Wood, 2d, of Dana College, Newark, N. J. (*Science*, Aug. 30).

The older scientific literature of Russia, Prof. Wood states, was usually published in one of the three languages most widely used among scientists. But even before the War and the Revolution, beginning about with the present century, Russian scientists began printing in their own vernacular, often giving exceedingly

sketchy abstracts in one of the Western languages. This has resulted in a mutual walling-off between science within and outside of Russia, to the mutual disadvantage of both sides.

Russian scientists, Prof. Wood admits, could quite logically demand that outsiders learn their language; but as a practical thing it does not look at all probable that they will do so. Besides, if they did, he points out further, there is a growing

scientific literature in Japanese, Finnish, and other languages impossible for the average European or American to read.

Since Latin, once the "lingua franca" of scholars, has long since been abandoned, Prof. Wood expresses the hope that his colleagues in the Soviet realm will be willing to make more use of one of the three commonly accepted international languages of science.

*Science News Letter, September 21, 1935*

## PHYSIOLOGY

## Map of Ear's Membrane Shows Parts "Tuned" to Each Pitch

Experiments With Guinea Pigs Demonstrate Selective Nature of Membrane; Low Notes Crowded at One End

ROSA PONSELLE'S notes do not sound the same to you as Lawrence Tibbett's. Of course not.

But just how do you tell them apart?

What is there in your hearing apparatus that tells you, now a soprano is singing, now a tenor?

Controversy on the old question of just how your ear or your brain sorts out sounds of different pitch and makes you distinguish between them was renewed at the meeting of the American Psychological Association. Agreement has been reached on some points, however.

The ear itself is the sorting mechanism, according to one viewpoint, presented by Dr. Elmer Culler of the University of Illinois and Dr. S. S. Stevens of Harvard. The membrane of the ear is so "tuned" that only one part of it will be set in vibration by a note of any particular frequency. In this it acts like a set of radio receivers, each tuned to pick up a different wavelength.

New evidence for this theory was shown to scientists at the meeting, in the form of actual maps prepared by these investigators, working independently, to show just where on the membrane different notes are picked up. At one end of the membrane, which is curled up in the ear like a snail in its shell, are the "receivers" for a wide range of the lower notes. All the notes of the human voice and those up to 2000 cycles are bunched in one half of the membrane, it was found.

The survey for Dr. Culler's map was made by applying each of 23 frequencies throughout the auditory range to one place after another on the membrane, until, by "listening in," the area of great-

est response was located. Dr. Stevens used guinea pigs which had injuries to different parts of the membrane. He carefully noted which tones the animals could not hear. In general, the two independently prepared maps agreed with each other and with theoretical maps of the human ear based on keenness of hearing for different pitches.

Of another school of thought are the Princeton scientists, Drs. Charles W. Bray and Ernest Glen Wever, and Dr. George P. Horton of the University of Washington. A very loud tone is not picked up by any single area of the membrane but sets the greater part of it in vibration, in the opinion of these investigators.

When animals hear a single very loud

pure tone until their ears are so tired that they are temporarily deafened, the deafness is not just for the tone which tired them but for all tones in general, indicating that the mechanism for picking up one note is not distinct from that for hearing other tones, Dr. Bray said.

Probably the difference in intensity of the tones studied accounts for why his results differ from those of the Illinois and Harvard scientists, he explained. For moderately loud tones, the place theory seems adequate and there is no dispute, he said.

*Science News Letter, September 21, 1935*

## CONSERVATION

## Hawaii Strives to Save Almost Extinct Wild Goose

HAWAII has a wild goose, called "nene" by the natives, which is among the rarest of birds. It is obviously closely related to the Canadian wild goose of North America but has been isolated for so long that it has developed into a breed that is distinct with its own peculiarities.

Nene at one time were abundant in Hawaii but as the country settled up they gradually approached extinction. Finally but a few remained in a domesticated state at two ranches high up in the mountains. It was then that the territorial fish and game authorities stepped in, secured a number of nene, and propagated them at their farm. Now there are some three score in the flock and careful provision has been made to prevent extermination of the species.

*Science News Letter, September 21, 1935*



THE RETURN OF NENE

## CHEMISTRY

# Unlimited Alchemy Foreseen In Understanding of Isotopes

**Ability of Science to Create "Any Element Whatever, Wherever and Whenever it Pleases" Forecast in England**

SCIENTISTS will some day create in the laboratory "any element whatever, wherever and whenever we please." This was forecast by Prof. F. W. Aston of Trinity College, Cambridge University, before the meeting of the British Association for the Advancement of Science.

Prof. Aston, as president of the section on mathematics and the physical sciences, spoke on "The Story of Isotopes."

Isotopes, the forms of an element which have slightly different atomic weights but similar chemical properties, are inseparably bound up with the new field of artificial radioactivity and transmutation of the elements, Prof. Aston pointed out.

Predicting synthesis of all elements "at a time not immeasurably far distant," the British scientist told his colleagues that they will then make possible "alchemy indeed in the service of man."

Illustrating what discoveries in isotopes may mean, Prof. Aston described how the puzzling atomic weight of the gas neon at 20.2 was cleared up.

It was found that there were really two types of neon in the chemical samples used in determining its atomic weight. One kind of neon had a weight of 20; the other of 22. The previously observed weight of 20.2 was the result of these two kinds being present in the ratio of 9 to 1.

Similarly, bromine, whose atomic weight was almost exactly 80, was found to consist of almost identically equal proportions of two isotopes weighing 79 and 81. Krypton, rare gaseous element in the atmosphere, was found to consist of six isotopes; xenon and tin have even more.

## Study Almost Complete

The study of isotopes by methods using the mass-spectrograph — often called an atomic scale because it determines the relative weights—is almost complete, Prof. Aston said. At least, he added, in so far as the isotopic identification is concerned.

Up to 1934 only four elements—gold,

platinum, iridium and palladium—had withstood the efforts of scientists to disclose isotopes for them.

Just this spring, at the meeting of the American Philosophical Society in Philadelphia, Prof. A. J. Dempster, University of Chicago physicist, announced the discovery of one isotope for gold.

Still more recently Prof. Dempster in a private communication to him told of finding five isotopes for platinum, Prof. Aston said.

The field of isotopes, the British scientist declared, is now being pushed to new degrees of accuracy in determining atomic weights.

Where instruments can now detect one part in 10,000, the demands of the new nuclear physics require accuracy of one part in 100,000. The battle of the "next decimal place" thus goes on.

Out of it all, Prof. Aston declared, will come the work to fulfill his prediction that scientists will some day realize the dream of the alchemists.

The practical implications of such success need no detailed amplification to emphasize their importance.

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## ELECTRICITY

## Human Fireflies Flit Through Malayan Woods

MALAYA, in the Straits Settlements, as a country of human fireflies is the picture a newcomer to the region sees first, reports U. S. Trade Commissioner Julian B. Foster of Singapore to the Bureau of Foreign and Domestic Commerce in Washington.

Malayan natives, it seems, are taking up the use of electric flashlights in ever increasing quantities.

Pointing out that of a total population of 4,500,000 people only 850,000 live in the cities of Singapore, Penang, Kuala Lumpur and Ipoh, Commissioner Foster goes on to state, "The remainder of the inhabitants live either in very small towns or hamlets where electric lighting facilities are poor, or else in the country itself

where no electric lighting is available. One of the most striking things noticeable to a newcomer to Malaya is the display of hundreds of torch lights that are in evidence in all parts of the country districts after dark."

What nations make the flashlights and the bulbs and batteries that go in? That is the interest of Commissioner Foster and the electrical industry of the United States.

In the field of flash and torch bulbs Japan leads the race. In 1934, when the imports of bulbs increased nearly five times, Japan secured nearly 72 per cent. of the total trade.

No figures for the average price of these flash bulbs is given, but a fair comparison would be to take the cost of automobile headlight bulbs. Such bulbs are landed in Singapore at price averaging 3.5 cents each for the Japanese product. British bulbs averaged 22 cents apiece and the American 13 cents. The prices given are in Straits Settlement currency.

Although the trade generally agrees that the Japanese bulbs are distinctly inferior to the British or American product, the competitors of Japan cannot begin to touch them on the question of price.

In the field of flashlight batteries, however, the United States is supreme.

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## ASTRONOMY

## Nova Flareups May Occur In Life of Every Star

STAR eruptions such as the one which produced the striking Christmas star of 1934, Nova Herculis, probably occur at some time or other in the life of every star in the universe, Dr. H. Spencer-Jones, director of Greenwich Observatory, told the meeting of the British Association for the Advancement of Science at Norwich.

Somewhere in the galactic system containing the earth and sun there are probably thirty such flareups annually. At this rate it would take some 3,000 million years, the Greenwich astronomer estimated, for all the stars in the galaxy to undergo the flaring nova phenomenon.

The theory of Prof. E. A. Milne, Oxford University mathematician, provides a reasonable explanation for the enormous outpouring of energy during the flareups of nova type stars, Dr. Spencer-Jones pointed out. According to Milne's theory the outburst comes from the release of gravitational energy as the star goes from one state of internal equilibrium to another. Such instabilities are known to occur during the evolution of a star.

*Science News Letter, September 21, 1935*



PHYSICS

# Practical Problems Planned For Atom-Smashing Device

## California Cyclotron Apparatus Now Being Enlarged To Make Possible Medical and Biological Research

**I**NTENSIVE research to turn the discoveries concerning the structures of atomic nuclei into immediate practical applications are under way at the laboratories of Prof. Ernest O. Lawrence at the University of California.

Prof. Lawrence's eighty-ton cyclotron apparatus, which whirls atomic particles round and round and finally flings them with terrific energy at specific targets, is being improved to increase further its capabilities in producing neutrons, the tiny atomic particles having no external electric charge. These neutrons are highly effective in penetrating through the electrical barriers which shield the nuclei of all atoms from bombardment.

A program of research to investigate practical uses for streams of neutron particles will start at once. Previous research has been concerned with highly technical work seeking to prove or disprove current theories of how atoms are put together which need experimental checking.

With the same apparatus, in its improved form, further work on artificial radioactivity will be undertaken to advance the problem of radiation therapy for such diseases as cancer.

Already synthetic radioactive sodium has been produced which gives off radiation comparable with that obtained from costly radium.

### To Provide Research Material

Laboratory production of the products of synthetic radioactive disintegration will be undertaken to supply material for use in problems of biology and medicine.

John H. Lawrence, brother of Prof. Lawrence, has already made studies on the comparable effects of neutron rays and X-rays as ionizing agents. He finds that an X-ray beam having an ionizing effect in air equal to that of a neutron stream has only one-tenth the ionizing effect of the neutrons on the blood of animals. Apparently the neutron rays are ten times as powerful.

The heart of the cyclotron device is a flat, airtight tank, in which deuterons or the skeletons of heavy hydrogen atoms are converted into bullets of exceedingly great energy to be used in bombarding

other atoms. At the present time Prof. Lawrence is building two new tanks for his atom gun, one of the same design as that now in use, the other of a new design which it is hoped will increase the output very greatly. The first of these new tanks will eliminate some obvious imperfections of the old tank and probably give an output 10 per cent. higher as well as more reliable. The second new tank which incorporates a more efficient method of putting electrical energy into it will, it is hoped, enable the California men to subject matter to bombardments far more devastating than any yet attempted. To carry this search for high energy projectiles with which to investigate the structure of matter still further, Prof. Lawrence plans later to enlarge the pole faces of the eighty-ton magnet which controls the movement of projectiles within the vacuum tanks. With larger pole faces on the magnet, he will be able to use larger tanks and again increase the energy of the bullets with which he is experimenting.

*Science News Letter, September 21, 1935*

METEOROLOGY

## Path of Hurricane Was Along Unusual Course

**L**IKE the course of a pirate ship sailing along the waterfront of a peaceful city and laying it waste with blasting broadsides, was the track of the recent hurricane's storm center.

Study of the official U. S. weather maps during and immediately after the nights of terror and destruction that brought manifold death to keys and coast shows that the center of the storm, the spot of lowest barometric pressure that sucks in wind at terrific velocities, first went directly over the "keys" or lowlying islands off the southern point of the peninsula, and then swung up along the Gulf coast as though steered by a malevolent intelligence. As it moved along this northerly course, the winds rushing in from surrounding areas of higher pressure tore squarely across the peninsula, so that practically the whole of the state was



PATH OF STORM

swept, though fortunately not all of it with the same devastating effect that made a shambles out of the "camps of the forgotten men."

Florida has been visited by hurricanes before, but the usual course of these tropical storms has been more directly westward into the Gulf, so that in previous visitations the track of principal destruction has lain athwart the peninsula, not parallel to it, with correspondingly more limited effects.

The violence of the storm is measured by the extremely low barometric pressure read on an instrument at Long Key, just two hundredths of an inch under 27 inches, the lowest ever recorded in the United States. Normal atmospheric pressure at sea level is 30 inches, and a gradient of an inch is ordinarily sufficient to account for a really considerable storm area.

*Science News Letter, September 21, 1935*

SEISMOLOGY

## Central Alaska Shaken By Moderate Earthquake

**C**ENTRAL Alaska was shaken by a moderate earthquake on Tuesday night, Sept. 3, the U. S. Coast and Geodetic Survey stated, after examining data transmitted through Science Service. The shocks began at 8:28 P. M., Eastern Standard Time.

Three seismograph stations reported: the Philippine Observatory at Manila, the private laboratory of Mrs. M. M. Seeburger at Des Moines, Iowa, and St. Louis University, St. Louis, Mo.

*Science News Letter, September 21, 1935*

## PSYCHOLOGY

**Prolonged Use of Alcohol Causes Loss of Intelligence**

**P**ROLONGED use of alcohol may cause actual loss of intelligence, Dr. Harry C. Mahan, of Warren State Hospital, Warren, Pa., told psychologists at the meeting of the American Psychological Association.

The case of a highly trained professional man who had lost intelligence until he had the mind of a ten and a half year old child was cited as typical of such cases by Dr. Mahan. The patient retains his vocabulary, however, and this serves as an index to his former intelligence, he said. His conclusions were reached from a study of fifty alcoholic patients.

*Science News Letter, September 21, 1935*

## SEISMOLOGY

**Earthquake Predictions Should Specify the Place**

**E**ARTHQUAKE prophets must "call their shots" more exactly, if they are to expect serious attention from scientific men. They must be able to tell not only that an earthquake is going to happen, but must also specify place and time within reasonably close limits. Moreover, to be counted as fulfilling a forecast, the quake must be of a certain respectable severity.

Notice of these rules of the seismological forecasting game has been posted by two well-known seismologists, Dr. Harry O. Wood of the Carnegie Institution of Washington and Dr. B. Gutenberg of the California Institute of Technology, (*Science*, Sept. 6).

Just saying that an earthquake is going to happen somewhere on the earth on a given day is of little significance, they point out, because earthquakes by the dozen occur almost daily. In a single sample year, the central earthquake reporting bureau at Oxford University gathered records of more than 7,000 quakes of all degrees of severity, occurring in all quarters of the globe. Even fairly large earthquakes, severe enough to be registered on instruments over half the earth's surface, piled up a count of 178, or roughly one every two days throughout the year.

Obviously, even random guessing at earthquake occurrence would find it hard to go wrong if locality is not closely specified, Drs. Wood and Gutenberg indicate.

The tidal forces within the earth, set up by the moon, sun and planets in certain positions, of which much has been

made in recently publicized earthquake predictions, do exist, but they are not in themselves the causes of earthquakes, the two seismologists point out. Actual causes of earthquakes are not known with any certainty, but mounting strains in the rock structures have a preponderating weight of evidence in their favor. Tidal factors may act as triggers when the strain reaches a certain critical point, where the proverbial last straw might cause a break.

However, the forces involved in "solid" tides in the earth's rocks are of widely different orders of magnitude. The moon exerts the greatest pull; the sun about two-fifths as much as the moon, while "effects due to the planets are only an exceedingly small fraction of those due to the sun."

Drs. Wood and Gutenberg deplore the widespread publication of any predictions in the present state of earthquake knowledge, because of the probability of "unwarranted worry and anxiety among large numbers of the population." Persons who have methods they consider good for earthquake prediction can perform a real though unblazoned service, they state, if they will place their forecasts, properly specific as to place, time and severity, in the hands of scientists, and then let the event be their impartial judge.

*Science News Letter, September 21, 1935*

## CIVICS

**National Planning Proposed In 17th-Century England**

**N**ATIONAL planning was proposed—and rejected—in England 250 years ago. And Prof. E. G. R. Taylor of the University of London thinks England has suffered ever since from the unwisdom of the choice.

In an address before the British Association for the Advancement of Science, he told of modern-sounding propositions put forth by seventeenth-century planners, including the creation of a green belt around London, the location of industries on selected rural sites, preservation and creation of urban amenities, reforestation, wasteland reclamation, national waterways, a planned agriculture, planned use of natural resources.

But England in those hustling, big-business days would have none of them. Rugged individualism prevailed, and each man did exactly what he pleased with his own property.

Prof. Taylor asked, "What would the geography of England be today had planning achieved the victory over *laissez-faire*?"

*Science News Letter, September 21, 1935*

**IN SCIENCE**

## ASTRONOMY

**New York's Planetarium To Open October Third**

See Front Cover

**T**HE HAYDEN Planetarium of the American Museum of Natural History in New York City will open on Thursday, October 3, F. Trubee Davison, president of the Museum, has announced.

Six times each week day and five times on Sunday the stars will go on parade in the \$650,000 structure. Forty-minute lectures will be given at each planetarium showing, during which the audience of 750 will be shown the positions of the so-called "fixed" stars from 3000 B.C., when Alpha Draconis, brightest star in the constellation The Dragon, was the north star, to the year 13,935 A. D., when the star Vega, now overhead, will be the north star. The motions of the planets through the constellations can be speeded up to take only a few minutes. The swinging of the celestial pole around in a circle, which in the sky takes 26,000 years, can be shown quickly.

Projection apparatus, built by the German optical firm of Zeiss, was purchased through funds supplied by Charles Hayden, in whose honor the planetarium is named. An R.F.C. loan, to be repaid out of the nominal admission fee, completed the erection of the structure.

Dr. Clyde Fisher, curator of astronomy of the Museum, will be active head of the planetarium, with William H. Barton, Jr., as assistant curator.

*Science News Letter, September 21, 1935*

## NAVIGATION

**New Radio Beacon Works On Cheap Crystal Receiver**

**A** NEW Swedish radio beacon has been erected on the Turkish coast of the Black Sea. It is located at a little village called Rumeli and is so constructed that its direction can be checked by an ordinary radio receiver. Even small fishing smacks with an inexpensive crystal set can find where they are, whether in fog or darkness, by tuning in on the new type of beacon. Ordinarily the ships have to have elaborate direction finders, too, in order to benefit from a radio "light" house.

*Science News Letter, September 21, 1935*



# EX FIELDS

## GEOLOGY

### Iceland's "Great Geysir" Resumes Its Eruptions

THE "Great Geysir" of Iceland, which gave its name to all periodically erupting hot springs of its type in the world, has resumed its activity, after having been "dead" since 1914. In that year, earthquakes accompanying an eruption of the volcano Hecla broke rifts in the geyser's subterranean "boiler," so that it could no longer develop the steam power necessary to throw its water into the air. Apparently natural repairs have now been effected.

Great Geysir seems to be not merely "as good as new" but even better. Before the damage occurred its eruptions averaged a height of about 120 feet; now they exceed 150.

News of the resumption of activity was sent to the German science publication, *Die Umschau*, (Sept. 1), by Dr. A. Rehm of Berlin.

"Geysir" is an Icelandic word meaning "spouter" or "gusher." With the change of one letter, it has been adopted into English as the common noun "geyser." Great Geysir was the first known of all the world's geysers. It stands on a desolate rocky plain, with a number of smaller hot springs and geysers, and one other hot-water vent, not a true erupting geyser, that bears the name of "Strokr," or "the churn."

*Science News Letter, September 21, 1935*

## PLANT PATHOLOGY

### Plant Disease Fungi Evolving New Varieties

EVOLUTION appears to be at its most active in producing new varieties of plant diseases to plague our grain crops. What one species of smut fungus can do in the way of producing new strains was dramatically outlined by Prof. E. C. Stakman of the University of Minnesota, speaking before the Sixth International Botanical Congress.

Prof. Stakman told of a research project in which a single reproductive cell of this smut fungus was isolated and its offspring propagated in the laboratory. Within a few months there were 162 dis-

tinct physiological strains of this one fungus from the single-celled start.

These physiological strains of plant-disease fungi are the more difficult for the scientist to deal with, Prof. Stakman stated, because within a given species they all look alike. They are different only in their behavior. Thus, there is one well-known variety of stem-rust of grain that attacks wheat and barley but not rye and oats, another that attacks rye and barley but not wheat and oats, and still another that attacks oats but none of the other small grains. Under the microscope they all look exactly the same; only their appetites in parasitism differ.

The multiplication of fungus varieties that occurred with the smut specimen in the laboratory is duplicated thousands of times over in the field, all the time. Many new varieties rise through hybridization through sexual crossing of existing varieties, but others occur without interbreeding, through the "straight evolution" process of mutation or "sporting."

There is an endless race between the plant breeder and the natural new origin of these plant diseases. The breeder will carefully produce a new crop variety that is resistant to all known diseases—only to have a newly originated disease pop up to attack it.

Then he has to go to work again. It is a fight in which there can be no quitting. The penalty for that is starvation.

*Science News Letter, September 21, 1935*

## EDUCATION

### Sons of Office-Holders Fill German Colleges

NEARLY half of the German students seeking higher educations are the children of fathers in official position, an official survey summarized in *Die Umschau* (Aug. 25) indicates. Of all those in the *Hochschulen*, which correspond more nearly with American colleges than with high schools, 45.6 per cent. are the sons of *Beamten*, or office-holders, 34 per cent. are offspring of parents in independent businesses, 7.7 per cent. are farmers' sons, 5.5 per cent. have parents in academic positions, and "all others" account for 7.2 per cent. of the students.

The heavy proportion of sons of official job-holders is increased, presumably, by the fact that many of the businesses that are in private hands in other countries are state-conducted in Germany. Railroads, telegraph and telephone lines are good examples. Employees of these enterprises, in all ranks, are of course rated as *Beamten*.

*Science News Letter, September 21, 1935*

## PUBLIC HEALTH

### Depression's Children Show Effects of Long Privation

CHILDREN between six and nine years of age in depression-poor families are showing in their weights the results of the change for the worse in their families' fortunes.

Growth in weight of this group of children has been "slightly but definitely reduced as compared with the growth of children of these ages in the group as a whole," Dr. Carroll E. Palmer, consultant in child hygiene of the U. S. Public Health Service, reports. The relative change in height and weight of some 5,000 city children during 1929 to 1933 was studied by Dr. Palmer. The children were of three family groups: those whose families remained in comfortable economic circumstances during the entire period; those whose families remained poor; and those of depression-poor families who had been comfortable in 1929 but had become poor by 1933.

"So far as growth weight of this sample from urban wage-earning families is concerned," Dr. Palmer concluded, "it is children from families whose income has fallen to a low level who have been affected by the economic depression."

The average weight of children from the continuously comfortable families was about 4 per cent. greater than the average weight of all the children taken together, Dr. Palmer found. The average weight of the children of poor families was roughly from 1 to 2 per cent. below the average for the group as a whole, while the average weight for the children of the depression-poor was in between.

Particularly interesting was the trend Dr. Palmer found for the three groups. When he plotted the relative weights (in per cent.) of the groups on a chart, the two lines for the continuously comfortable and comfortable-becoming-poor groups started almost together. The line for the first group remained at the same level throughout the five-year period but the line for the second group inclined definitely downward. The line for the third group, children of continuously poor families, inclined slightly upward.

The material for the study was obtained from a joint survey by the U. S. Public Health Service and the Milbank Memorial Fund of the economic status of approximately 1,000 families each in Baltimore, Birmingham, Cleveland, Greenville, S. C., Pittsburgh, and Syracuse, and from school records of the children in these families.

*Science News Letter, September 21, 1935*

PSYCHOLOGY

# Blame the Weather

## Japanese Scientist Offers You a New Excuse For Forgetfulness; Bad Weather Makes You Absent-Minded

By EMILY C. DAVIS

**L**OOK out! Absent-minded weather ahead!"

A ridiculous idea, predicting absent-mindedness? And hooking it up with weather, too?

Apparently not. For scientific experiments now reveal that you are more apt to walk off and leave your parcels and other belongings on certain kinds of days. Those certain days, troublesome and exasperating, are the days when humidity suddenly rises, and clouds threaten rain. That's absent-minded weather.

You can see, now, why there are so many jokes about day-dreaming professors who go about losing umbrellas. Absent-minded weather is umbrella-carrying weather. And professors—but more about that sort of person later.

A Japanese scientist, K. Hisazuka, has demonstrated the connection between weather and this particular form of forgetfulness. He had the clever idea of counting the thousands of articles lost on street cars in a year in Tokyo and Yokohama.

In Tokyo—Japan's New York—a million and a half daily riders leave 200 of their belongings a day—just an average street car rider's day—for the car company employees to gather up. It looks even more impressive added up to 73,000 articles a year. But the lost-and-found department does not do the same steady business in books, parasols, and packages day in and day out. The rate, compared to the number of riders, rises and falls. Why?

### Humidity

The Japanese meteorologist put his 365-day score of lost articles beside the year's weather record. He looked to see if heat or cold made people forget their property. He checked up on humidity. There it was—humidity.

On days when the air suddenly becomes laden with a high per cent. of water vapor, housewives, business men, and school children suffer from a sudden outbreak of forgetting things.

Humid days are notoriously oppressive. Everybody complains of them. Per-

haps they lower human energy, so that attention lags. Then, three hours later comes the sudden cry: "Where could I have left that birthday cake? I certainly started home with it!"

Damp, sticky weather often goes before rain. So, it may be, too, that the extra equipment people hang on themselves for doubtful weather is an aid to forgetting. Obviously, umbrella and raincoat are handicaps in the game of coming home with everything you are supposed to bring. And if rain actually falls, and garments drip, there is added distraction. On a day like that, most people could lose a bass drum and never miss it.

### Several Causes

Explaining exactly why weather can provoke absent-mindedness is not easy. There are probably a number of contributing causes, such as those just suggested.

With the customary brevity of weather men, M. Hisazuka merely announces the relationship between mind and weather, which his statistics reveal.

Reporting to the Meteorological Soci-

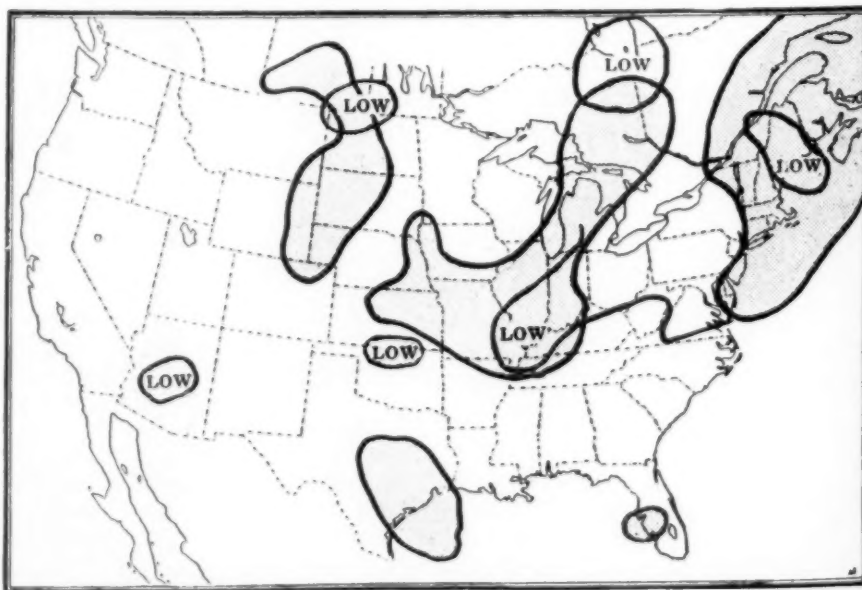
ety of Japan, he says: "Sudden increase of humidity and the decrease of the atmospheric pressure generally precede an increase in forgetfulness."

The second factor that he mentions—lowering of pressure in the gas we breathe as "air"—is a symptom of stormy weather which often goes along with humidity. On United States weather maps the areas of low pressure, which winds generally carry from west to east, are the stormy weather warnings. You can read them also as warnings of brain "storms" of forgetfulness, judging by the Japanese weather man's findings.

### New Usefulness

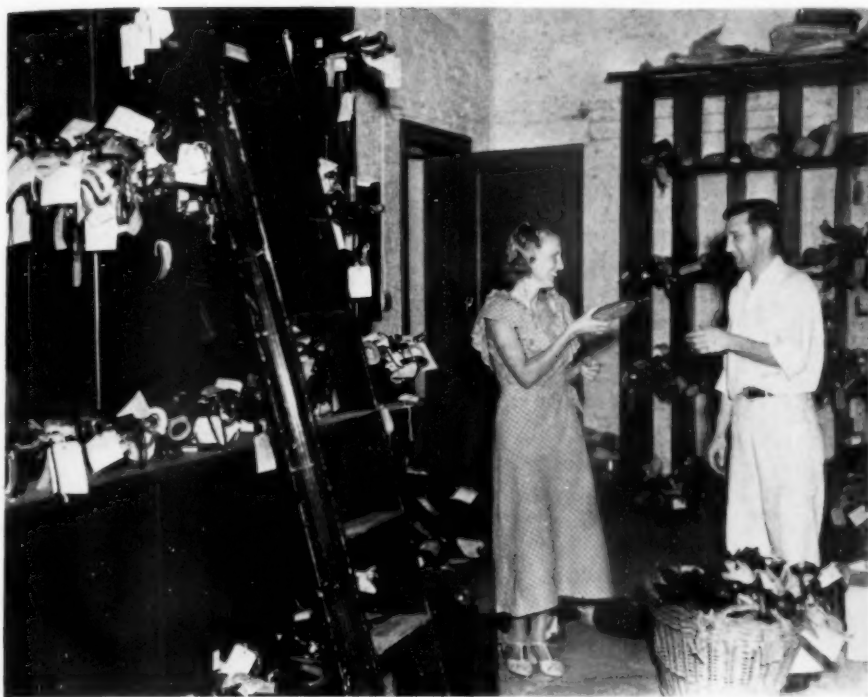
His study of absent-mindedness opens up a new usefulness for weather forecasts. When you scan the weather news for the day, and learn that it will be cloudy and perhaps wet, and the barometer is falling, that is the time to take extra precautions against forgetting.

It may sound fantastic to suggest that. But in recent years weather warnings have been put to many a novel use and found valuable, from showing merchants the psychological time to advertise galoshes, to helping women decide when to have their hair curled. When marcel waves made by curling irons were the height of



AREA OF ABSENT-MINDEDNESS

The weather man's "lows"—low pressure areas—are warnings usually of stormy weather and also of brain "storms" of absent-mindedness. On the day represented here, rain was falling in wide areas, as shown by the shading.



#### LEFT BEHIND

*Even the baby's bottle can be forgotten. Not to mention false teeth, and a load of baseball bats. But umbrellas make the most conspicuous show at the lost and found office of the National Capital's street car company—and in most other exhibits of the consequences of human absent-mindedness.*

fashion, weather stations received frequent calls for advice on this subject.

In absent-minded weather, it might be well, for example, to arrange to have parcels sent, rather than haul them home. It might be safer, too, to jot down notes of errands and engagements, not trusting to memory alone to get you there.

How much would a breakfast-time warning actually help to prevent mishaps?

A good deal, judging by rules and suggestions which one European physician gives his patients who suffer from acute absent-mindedness or defective memory.

Absent-mindedness and forgetfulness can be guarded against, to some extent at least, is the view of this physician, Dr. Arnold Lorand, of Carlsbad, Czechoslovakia. He has devoted an entire book to these mental problems, drawing helpful ideas from the cases of famous persons and from his own experience with patients.

#### Lack of Attention

Absent-mindedness is "not paying attention." This is the simple definition he offers. The absent-minded man lets his thoughts drift off to his hobby or his worries, or whatever else he is absorbed in. He is so engrossed in his day-dreaming that he pays too little attention to where he is putting an important paper, or

what time his wife is patiently saying she will meet him for dinner, or to what strange neighborhood the bus driver is rapidly carrying him.

Says Dr. Lorand: "The automatic pursuit of activities, forgetful of self, as it were, may bring the absent-minded man into all kinds of amazing situations."

Absent-mindedness is a special kind of forgetfulness. Other kinds of forgetful people may have trouble recalling some fact they once learned, and learned well. The absent-minded forgetter never really takes the fact into his mind. His specialty is forgetting things in the present or future, not the distant past.

#### Wool-Gathering

And it is all due to his wandering wool-gathering wits. Some people suffer seriously from this weak-willed attention. Most people get overtaken by it, unawares, once in a while.

Here are summed up some practical ways of warding off the troubles of absent-mindedness and other kinds of forgetting, suggested by Dr. Lorand:

1. Notes are "necessary crutches" for people who have any difficulties of this sort. But, careful, don't be like Leonardo da Vinci. He took notes on everything he read and thought. But he always mislaid the notes, he was so disorderly.

2. Tying knots—the French call them

"asses' knots"—in your handkerchief is good, if the rite is properly done. Tying the knot is no magic. You must concentrate on the point to be remembered while tying the knot, and even a minute or two after. And it is helpful to repeat aloud the name or number, or whatever you want to remember. Do that 10 or 15 times.

3. Just before going to sleep is the best time to tie knots or otherwise fix matters in the memory.

4. Putting your hat over, or under, an umbrella or other likely-to-be-forgotten object is a good idea. It is a very absent-minded person indeed who goes off without his hat.

#### Pay Attention

And, of course, it goes without saying that the first and foremost rule is to work at the job of paying attention and fixing whatever needs to be understood, firmly in your mental filing system.

The absent-minded professor or the absent-minded genius gets into ridiculous situations, which go down in history, all because he fails to do this. He is so engrossed in his beloved subject, that everyday matters, however important, simply fail to "get in."

Sigmund Freud, expounder of psychoanalysis, tells of one noted German chemist who forgot the hour of his wedding, and calmly went to his laboratory to work instead of meeting his bride at the church. He considered this a warning that he was not destined for a very happy domestic life, and "wisely" according to Freud, he lived unmarried until he died at a ripe old age.

#### Did Work Twice

Prof. Michael Faraday, great chemist and physicist, worked six weeks on a series of experiments and got negative results. Then, a trifle late, it occurred to him to look up his research notes, for Faraday knew his own absent-mindedness and kept notes. He discovered to his dismay that he had done the same experiments, with the same fruitless results, less than a year before. In his busy mind, the problem he was trying to solve and the principles involved were clear enough. But the mere mechanics of an unsuccessful experiment could keep his hands and some part of his mind busy for six weeks without making any lasting imprint on his memory. Men of this type can easily forget to eat, forget their own weddings, and are fated to cut a strange figure wherever they go.

The average person, whose absent-mindedness is confined to an occasional lapse of attention, may think he has little in common with the acutely absent-



mind person. But the exaggerated case serves to show up absent-mindedness, with all its curious traits, just as a picture thrown on a large screen is easier to study.

Moreover, the average person struck once in a while by absent-mindedness does just as strange things as the genius.

The street car company in the National Capital of the United States, where riders include Congressmen, tourists, government clerks, job seekers, wives and school children, gathers in 12,000 to 15,000 lost articles a year. The assortment includes anything and everything from babies' bottles and bird cages to false teeth.

"Oh, yes," nods the young woman in charge, "people do take teeth out when they hurt, and lay them down on the car seat, and walk right off without them."

### Children Too

School children are particularly absent-minded and can lose things that would do credit to any genius' record. A dozen baseball bats were abandoned by one young ball team, and never even called for.

The Japanese weather man's study shedding light on the weather's role in promoting forgetfulness is not the first scientific attempt to link weather with human conduct. Some years ago, Dr. Edwin G. Dexter made a series of statistical studies, comparing weather reports against police records, against banking clerks' errors, against children's behavior in school. The weather, as he had suspected, does tip the scales in favor of one line of conduct or another. His curves and charts showed it.

### Humidity Causes Errors

Dr. Dexter put his surprising discoveries into a book "Weather Influences," now out of print but still often quoted. He became a physician in the U. S. Veterans' Bureau at Washington, and abandoned his inquiries into what the weather does to nerves, efficiency, energy, and emotions.

To his work, done thirty years ago, the new investigation in Japan adds confirmation of the weather's power to help or hinder. Dr. Dexter found, for example, that bank clerks make more mistakes in their calculations on humid days than on dry ones. Cloudy and rainy weather also yielded a harvest of errors. The strategic factor, he concluded to be attention. The clerk bending over his accounts has trouble in bad weather to keep his mind on his work, just as the wife returning home from shopping is now shown to be extra-likely to lose her head, figuratively, and her umbrella or purse, literally.

*Science News Letter, September 21, 1935*

### ENTOMOLOGY

## 3300 Ants in Single Colony Are Part Male, Part Female

SEX mixups of a most fantastic kind, involving at least one-fourth of the population of a large colony of ants, were described by the noted American entomologist, Prof. William Morton Wheeler of Harvard University, before the meeting of the British Association for the Advancement of Science.

The colony was discovered on the British-owned island of Trinidad last spring, by Dr. N. A. Weber, and was studied jointly by Dr. Wheeler and himself. Formal publication of their results will be made in the United States at an early date.

The mixed-up condition consists in each affected insect's being partly male and partly worker-female or "neuter." In many, the front part of the body looks like that of a male and the back part has a female appearance. In others, "islands" of femaleness appear in the midst of male areas, and vice versa. No two of the insects thus far examined are alike in either the degree or distribution of their assorted sexualities.

In the particular species to which this colony belonged, Dr. Wheeler explained, the males have longer legs than the fe-

males. Some of the "sex-assorted" ants had male legs on one side and female legs on the other. The result was that they could travel only in circles, like the famous but fabulous "side-hill gouger" of Western myth.

In all, Dr. Weber has counted some 3300 of these peculiar ants, all of them being offspring of the same queen ant, who was herself apparently normal in every respect. It is the only instance on record of anything like so large a proportion of "mixed-sex" ants in a colony. In fact, during the past 80 years, only 75 such ants have been found among all the hundreds of thousands of specimens that have been examined by entomologists. Only one other instance in the history of modern science can be compared with it, the discovery of a similar phenomenon in a colony of bees near Lake Constance, by the famous German scientist von Siebold in 1864.

Insects and other animals that display such a patchwork of sex characters are known to science as "gynandromorphs." Taken to pieces, this tough-looking Greek word means "female-male-forms."

*Science News Letter, September 21, 1935*

### SEISMOLOGY

## Deep Earthquakes Show Flaws 62 to 180 Miles Below Crust

DEEP-focus earthquakes occurring hundreds of miles inside the earth instead of merely in the comparatively thin upper crust of rock are being intensively studied by seismological scientists, Dr. F. J. W. Whipple of Kew Observatory, Richmond, Surrey, told the meeting of the British Association for the Advancement of Science.

Most earthquakes recorded at the seismological stations throughout the world originate, Dr. Whipple said, less than 31 miles below the earth's surface. Quakes at deep foci start many times deeper than this.

In Japan, especially, he pointed out, studies show that these deep quakes are distributed in a very remarkable way, indicating that there exist well-defined flaws in the earth at depths of from 62

to 180 miles and far below the level of isostatic compensation.

Such new findings are among the most spectacular of recent advances, Dr. Whipple stated. The reason is that present beliefs tend to picture the solid rocky crust of the earth as floating on a denser semi-plastic material lower down. As one part of the crust sank down into the material, there was a compensating uplifting somewhere else on the earth. Mountain ranges such as the Himalayas appear still to be undergoing this lifting process.

That the underlying semi-plastic material might itself have well-defined flaws still lower was hardly considered until the recent discoveries based on the way earthquake waves are transmitted through the earth.

*Science News Letter, September 21, 1935*



#### WRITING IN SAND

This novel research library in bottles consists of a collection of specimens of sand from areas all over America and some foreign countries indexed according to geographical location.

ASTRONOMY

## Age of Universe Is at Least 10,000,000,000,000 Years

**N**EW evidence that the universe is at least 10,000 billion years old was reported by Sir James Jeans, noted British astronomer and cosmologist. (*Nature*, Sept. 14).

To Prof. Robert Grant Aitken, veteran director of Lick Observatory, Mt. Hamilton, Calif., goes the credit for what may be the astronomical measurements which will help decide the long-continued controversy on the age of the universe, Sir James indicates.

Prof. Aitken has just published the newest edition of his famous treatise on

binary, or twin, stars which rotate about one another far out in space like balls on the ends of a dumbbell.

The orbits and the relative masses of the two parts of such binary stars can be used to calculate their age and, hence, some minimum age for the universe. New data given in Prof. Aitken's book, reports Sir James, can be used in calculations which are in good agreement with the so-called "long time" scale for the age of the universe, or 10,000 billion years.

Other estimates based on the time in which the universe has expanded to its present proportions from some central grouping yield values for the age of the universe as only 10 billion years, the "short time" scale. The large factor of 1,000 times between the short and long time scales is what Sir James hopes Prof. Aitken's data will clear up. Sir James is an advocate of the long time scale.

*Science News Letter*, September 21, 1935

The world's ancient letters include several on clay tablets that were sent by Crown Prince Sennacherib to his father, King Sargon.

GEOLOGY

## Library in Sand Is Aid To Research on Concrete

**W**RITING in the sand is not as perishable as the world has been led to suppose. A sand library of more than three thousand "volumes" is an important adjunct of the research laboratory of the Portland Cement Association in Chicago. The "volumes" are bottled samples of sand from all over the American continent and some from foreign countries.

What the research specialists may read from these "volumes" is highly important to the construction industry because it aids in making more enduring concrete structures.

There are two principal kinds of sand—siliceous and calcareous. In the library, however, the sands are indexed according to geographical location, for greater convenience in referring to the adaptability of sand from a given location in making durable concrete.

The first step in investigating the quality of sand is to make a sieve analysis to determine the relative proportions of each of eight different sizes of grains which may be present.

Next comes a silt analysis to find the amount of dust present. Sand of which more than 10 per cent. will pass through a sieve with 100 meshes to the square inch gets a poor rating for the making of concrete.

The sand sample is next tested to learn whether organic matter is present. When the sand is immersed in a solution of sodium hydroxide, a change of color in the solution reveals the presence of organic matter. (Turn to Next Page)

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## ● RADIO

Tuesday, Sept. 24, 3:30 p. m., E.S.T.

**THE DEPRESSION AND MENTAL DISEASE**, by Dr. Carney Landis, New York State Psychiatric Institute and Hospital.

Tuesday, Oct. 1, 3:30 p. m., E.S.T.

**FOSSIL FOODS**, by Dr. Ralph W. Chaney, Professor of Paleontology, University of California.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

In some instances the sand is given the sodium sulphate test to learn its ability to stand weathering. In this test crystallization of the sodium sulphate when evaporated exerts pressure within the grains of sand. If this pressure breaks up the sand particles, it is evidence that the sand would not hold up, under freezing and thawing and other weather hazards, if mixed in concrete.

Finally the sand may be subjected to strength tests by being made up into ce-

ment mortar and tested for both compression and tensile strength.

This knowledge is extremely valuable to the construction industry because it serves as a guide to the best sources of supply of sand for important building projects in which concrete is used.

It is often desirable to use local sand, and the information in the sand library tells whether such sand is suitable.

*Science News Letter, September 21, 1935*

#### PUBLIC HEALTH

## Pneumonic Plague Threatens U. S., Especially West Coast

### Danger Arises From Increasing Spread of Plague Among Ground Squirrels; Only One Human Case

**P**NEUMONIC plague is an increasing threat in the United States, particularly to the Pacific coast states.

The most extensive outbreak of plague among ground squirrels since the peak of the animal epidemic in California between 1907 and 1919 is being experienced on the west coast. Recent reports also show the presence of rodent plague in Montana.

This disturbing picture is presented by Dr. W. H. Kellogg, chief of the division of laboratories of the California State Department of Public Health, Berkeley. (*Journal, American Medical Association*, Sept. 14).

"There are two particularly disturbing aspects of the present ground squirrel epizootic," Dr. Kellogg declares. "One is the demonstration that the ground squirrel infection not only is not decreasing after thirty years, but is increasing and expanding over a much wider territory. It is now found not only in the Coast Range and the interior valleys of

California but in the Sierras. The establishment of a permanent endemic rodent focus is thus thoroughly demonstrated."

The second cause for alarm, as viewed by Dr. Kellogg, is the evidence of renewed virulence and of increasing pulmonary tendency on the part of the prevailing strain of the plague-causing organism. The pneumonic plague—more deadly to man than the bubonic—is thought to be directly related to the plague in squirrels and groundhogs.

A plague survey crew, operating with a motor truck, is busy in California. The workers find that the disease is actively spreading among rodents in widely separated areas far from any formerly known focus of infection.

Redoubled efforts are being made by the U. S. Public Health Service to protect the human population from this dreaded disease and to check its extent among rodents. Protection of the human population has been almost 100 per cent. successful. So far only one case of plague

has been reported this year and there were none in the United States last year.

Dr. C. R. Eskey, who has had an extensive experience in anti-plague work in South America and Hawaii, has been put in charge of the anti-plague operations on the West Coast. Assisting him is Dr. V. A. Haas, also of the U. S. Public Health Service. Formerly only one Service officer was assigned to this work.

The U. S. Public Health Service has been attempting to combat the extension of plague among the rodents in California ever since 1900, when its existence there was first recognized. Inadequate funds have always seriously handicapped the Service in this work, however.

Epidemics of plague among man result when the infection spreads from rat to rat or from squirrel to squirrel through the medium of the flea bite.

Pneumonic plague, in which pneumonia develops, becomes highly infectious from man to man without the mediation of rat, squirrel or flea because the bacilli are in the sputum and transfer takes place by droplet infection, it is explained.

The death rate from pneumonic plague is very high, almost 100 per cent., according to Dr. Kellogg. The illness is short—from a few hours to two or three days.

*Science News Letter, September 21, 1935*

#### SEISMOLOGY

## Center of Earthquake Was Near to Northern Japan

**K**UNASHIRI Island, near the northern end of the Japanese chain, was close to the epicenter of an earthquake of rather marked severity on the morning of Wednesday, Sept. 11, according to calculations of the U. S. Coast and Geodetic Survey, based on data transmitted telegraphically through Science Service. There is a possibility that the disturbance may have stirred up a tidal wave.

The epicenter was located in latitude 45 degrees north, longitude 146 degrees east, approximately. The earthquake began at 9:04.1 A.M., Eastern Standard Time.

Reports were sent to Science Service by the Dominion Meteorological Observatory, Victoria, B. C.; the Seismological Laboratory, Pasadena, Calif.; the University of California, Berkeley, Calif.; St. Louis University, St. Louis, Mo.; and the stations of the U. S. Coast and Geodetic Survey at Ukiah, Calif., and Tucson, Ariz.

*Science News Letter, September 21, 1935*

The tulip tree was made the state tree of Indiana, in 1931.

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BIOLOGY

## NATURE RAMBLINGS

by Frank Thone



### The Survival of the Old

IN THE unending struggle for existence that goes on in the natural world, most of the victims that perish are babies.

The naive picture of the survival-struggle that most of us have is typified by a couple of tigers fighting furiously for meat. The victor feeds and lives, the vanquished slinks off to die of his wounds or starve.

But dramatic competitions of this kind are comparatively rare in nature. Much more typical is the suppressing of huge numbers of competing individuals by sheer overcrowding. Thus if a clearing is made in a forest, by fire, wind, ax or other agency, thousands of seedlings spring into being, standing "thick as hair on a dog's back." After a time the more vigorous saplings outgrow the others, and the great majority, deprived of sunlight, die. In the end, the tallest survive.

Then ensues a stage of development in which the established mature trees monopolize the place. They do not permit enough sunlight to filter down through their interlaced tops to feed any seedlings on the forest floor. At most, there will be a scattering of pindling, anemic little trees, struggling along as best they can on chance patches of thin sunlight where the monopolizing canopy set up by their elders has a few leaks in it. Little Lazarus-trees they are, feeding on crumbs from the high table.

Yet all the time the old trees are producing millions of seeds apiece every year, lavishly throwing them away through the conflict between their natural urge to look out for themselves first and the equally natural urge to reproduce.

The same sort of thing occurs, in one form or other, in all nature. All egg-laying animals, from the lowliest worms to the loveliest birds, produce many times as many eggs as are needed to maintain

their normal numbers in the world. Fungi, ferns and other lower plants pepper the air with literally quintillions of spores. There is an unending, myriad slaughter of the innocents, all because the world is already filled to near-repletion with their elders. Only when death makes a gap in the senior ranks is there a chance for a few of them to grow up as replacements.

Even in our own species, for all our

lofty pride as the "highest primates" the old press down the young. Crowding populations make wars in which men kill men—yet children die faster from pestilence and want. In the Occident, we have added the further factor of an artificially limited birthrate. In a thousand ways it is made plain, all the way from ameba to man, that until the old are fed no more young mouths are wanted.

*Science News Letter, September 21, 1935*

### MEDICINE

## Advises Exercise in Water For Arthritis Sufferers

EXERCISE and massage in the water, similar to the treatments given patients recovering from infantile paralysis, were recommended for sufferers from chronic arthritis at the meeting of the American Congress of Physical Therapy. Methods and results of such treatment of arthritis, the "rheumatism" of grandfather's day, were described by Dr. Euclid M. Smith of Hot Springs National Park, Arkansas.

"The relatively free movement without pain and the performance of exercises in water, such as walking, impossible to perform out of water, gives the patient a pleasurable sense of activity which can only be appreciated by one who has been confined to the bed or wheel chair," Dr. Smith said.

The buoyancy of the water enables the patient to move about much more freely with a minimum of pain and effort, Dr. Smith explained. He and his associates use for these treatments the natural Hot Springs water at a temperature of 98 to 99 degrees Fahrenheit. The warmth of the water dilates the small blood vessels at the surface of the body, "which increases the flow of blood and lymph to the parts, stimulates the nutrition of muscle tissue and promotes the elimination of toxic waste material."

Dr. Smith believes that heat applied by immersion in warm water while exercise and massage are being taken is more effective than heat by baking followed by exercise or massage.

Exercise under water for treating arthritis was adopted as a result of studies by the late Dr. Robert W. Lovette of Boston and Dr. Charles L. Lowman of Los Angeles, Dr. Smith pointed out.

Underwater treatment, he said, must be considered as only a part of the general physiotherapy program which is an important adjunct to the proper medical

care of the chronic arthritis patient.

"Heat, exercise and massage are the standard methods of treatment for muscular atrophy as well as joint affections," he continued. "The underwater treatment is based upon these fundamental principles of physiotherapy. Its application to the treatment of chronic arthritis is directed toward the prevention and correction of deformities, the restoration and reeducation of the atrophied muscle groups, the restoration of joint function and general body tone, and the correction of faulty body mechanics."

*Science News Letter, September 21, 1935*

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## Philosophy

MAN, THE UNKNOWN—Alexis Carrel—*Harper*, 346 p., \$3.50. Thoughtful readers are certain to enjoy this very stimulating book which is the September selection of the Scientific Book Club. It is to be hoped that it will be read by many of the less thoughtful. It fully justifies its author's claim that it "puts at everyone's disposal an ensemble of scientific data concerning the human beings of our time." What is now known about man's body and mind is told, briefly but sufficiently, and the tremendous gaps in that knowledge, together with their bearing on civilization and mankind's future, are pointed out. Dr. Carrel uses scientific and technical terms without apology or explanation. Consequently the layman may need to read it with a dictionary handy. But this does not deter from the readability of the book and will not make it less enjoyable.

*Science News Letter*, September 21, 1935

## Zoology

TWO NEW FORAMINIFERA OF THE GENUS TEXTULARIA—Cecil G. Lalicker—*Smithsonian Institution*, 2 p., 1 plate, 5 cents.

*Science News Letter*, September 21, 1935

## Zoology

FOURTEEN NEW SPECIES OF FORAMINIFERA—Joseph A. Cushman—*Smithsonian Institution*, 9 p., 3 plates, 10 cents.

*Science News Letter*, September 21, 1935

## Astronomy

EXPOSÉ D'ASTRONOMIE STELLAIRE: IV, DÉNOMBREMENTS D'ÉTOILES—H. Mineur, 56 p., 15 francs; V, LES SPECTRES DES NEBULEUSES GAZEUSES—P. Swings, 26 p., 10 francs—*Hermann & Cie., Paris*.

*Science News Letter*, September 21, 1935

## General Science

A STUDY-BOOK IN GENERAL SCIENCE—Wilbur L. Beauchamp, and H. H. Miller—*Scott, Foresman & Co.*, 335 p., 80c. To accompany the text, *Everyday Problems in Science*.

*Science News Letter*, September 21, 1935

## Juvenile Literature

LITTLE DOT LEARNS—D. H. Patton and Gertrude Ihle, 71 p., 24c.; JIMMIE JUMBO GENTLEMAN—D. H. Patton and Gertrude Ihle, 135 p., 30c.; ALCOHOL TALKS TO YOUTH—Howard E. Hamlin, 64 p., 24c., *School and College Service*. Another series of those interesting and

helpful little books for the juvenile. The first two on etiquette are for grades one and two and two and three respectively. The last is suitable for grade seven and above.

*Science News Letter*, September 21, 1935

## Biography

THE MAGNATE: WILLIAM BOYCE THOMPSON AND HIS TIME—Hermann Hagedorn—*Reynal and Hitchcock*, 343 p., \$3. Scientists will probably be most interested in the account of how the Boyce Thompson Institute for Plant Research began. But as the blurb says, the book presents "A full portrait of a unique rugged individualist and a story of his era of mining booms, big business and frenzied finance, as well as his services to America in scientific research, politics and the Russian Revolution."

*Science News Letter*, September 21, 1935

## Agriculture

CLASSIFICATION OF WHEAT VARIETIES GROWN IN THE UNITED STATES—Allen Clark and B. B. Bayles—*Govt. Printing Office*, 164 p., 46 pl., 25c. This publication will be of high usefulness not only to specialists in cereals, but to the general agrostologist, the teaching botanist and the farmer who tries to plow brains as well as fertilizer into his fields.

*Science News Letter*, September 21, 1935

## World Affairs

CLASHING TIDES OF COLOR—Lothrop Stoddard—*Scribner's*, 414 p., \$3. Stoddard's preoccupation with racial questions is well known. In this work he surveys the working ferment of the non-white races all over the world, ill at ease under the veneer of Occidentalism that has been thrust on many of them, actively revolting in some places; in others, as in imperialistic Japan, making use of Western technology in an effort to solve what may be unsolvable problems. The book ends with a large question-mark.

*Science News Letter*, September 21, 1935

## Physics

TRANSMUTATION DES ÉLÉMENTS PAR DES PARTICULES ACCÉLÉRÉES ARTIFICIELLEMENT—Manuel Valadares—*Hermann & Cie, Paris*, 29 p., 10 francs.

*Science News Letter*, September 21, 1935

## Biography

THE ATTITUDE OF VOLTAIRE TO MAGIC AND THE SCIENCES—Margaret S. Libby—*Columbia Univ. Press*, 299 p., \$3.75. The purpose of this book is to find out and evaluate the idea of Voltaire in the realm of the sciences in order to widen knowledge of the scientific point of view of educated men of the early eighteenth century. It is an interesting story and documented account of a "philosophical journalist" and an epoch.

*Science News Letter*, September 21, 1935

## Geography

LIVING HIGH: AT HOME IN THE FAR ANDES—Alicia O'Reardon Overbeck—*Appleton-Century*, 382 p., \$3. Family life in an Andean mining camp, as told by an American mother who undertakes to rear her brood in a condor's aerie. Even though one is an alien, if one is "simpático" it is possible to blend into the landscape to an astonishing degree.

*Science News Letter*, September 21, 1935

## Botany

BRITISH STEM- AND LEAF-FUNGI, COELOMYCETES. Vol. I: SPHAEROPSIDALES—W. B. Grove—*Macmillan*, 488 p., \$7. Although intended only for the advanced student and research worker in mycology, this book will be invaluable to them, not only in Britain but for comparative purposes everywhere else in the world.

*Science News Letter*, September 21, 1935

## Natural History

CRUSTACEA BRACHYURA — Isabella Gordon—78 p.; RHIZOCEPHALES (SUPPLEMENT)—H. Boschma—16 p.; *Musée Royal D'Histoire Naturelle de Belgique, Brussels*, *Memoires*, Vol. III, Fasc. 15 and 16. Obtainable from the Museum.

*Science News Letter*, September 21, 1935

## Mathematics

A TABLE OF EISENSTEIN-REDUCED POSITIVE TERNARY QUADRATIC FORMS OF DETERMINANT UP TO 200—Burton W. Jones—*National Research Council*, 51 p., \$1.

*Science News Letter*, September 21, 1935

## Physics

STRUCTURE NUCLÉAIRE—G. Guébin—*Hermann & Cie., Paris*, 31 p., 10 francs.

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